

THE
PSYCHOLOGICAL BULLETIN

SPRING SUSPENSION FOR LABORATORY MOTORS.

Small motors of high velocity, such as are used in laboratories in verifying the laws of color-mixing or in driving apparatus, when left free on a table or clamped to it, produce a noise that is troublesome and under some circumstances intolerable. This fact led five or six years ago to a trial of certain remedies, one of which proved thoroughly satisfactory and has been in use here since that time. By this means the reduction of noise is about as great as that effected by holding the motor in the hands, so that a large number of motors may be in use in a room at the same time without disturbing individual concentration or instruction or making a noise that is felt to be disagreeable by the average person.

The device consists of suspending the motor by one or more springs, according to the position and work required.

Fig. 1 represents the mode of suspension for a color-mixer rotating in a vertical plane.

The more extensible the spring the less will the motor be able to communicate vibration to the point of suspension; long, extensible springs have this advantage, but rather short and stiff springs will give results sufficiently good for most purposes. The springs employed have usually been from four to eight inches long and have stretched from two to four inches respectively from the weight of the motor.

The point of suspension may, of course, be anything suitable, such as the arm of a standard, which is convenient if the motor is to be moved about, as may be the case in giving demonstrations before a class; attachment by means of a wire to a hook in the ceiling is also a good way, especially for motors to be used in general laboratory practice.

As the motor hangs free, it can easily be turned and moved in any direction so as to bring the discs into the best light or to the point for most convenient inspection. Rocking or twisting movements of the

motor have not proved troublesome; the motors keep the plane of rotation quite steady, partly no doubt because of the very considerable gyroscopic force developed, the effects of which are easily detected

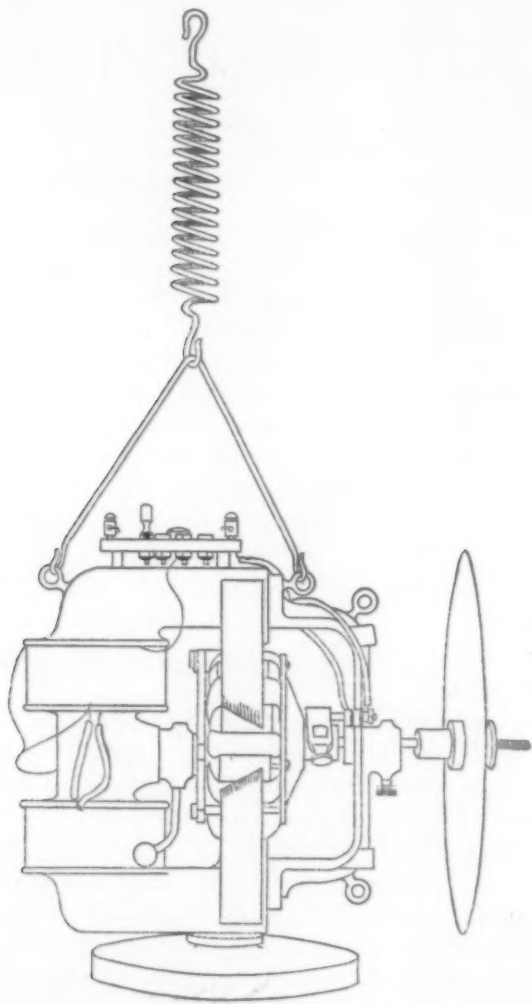


FIG. 1.

when a motor is held in the hands and its plane of rotation is forcibly and suddenly altered.

Motors with heavy armatures keep in motion so long after the current is turned off that the use of a brake is very desirable. It

would be well if motors of this type, when constructed especially for color experiments, were fitted from the start with brakes; if they are not so equipped, a simple form of brake can be made by screwing a short cylinder on in front of the disc holder, to which friction is then applied by means of a U-shaped metal band fitting closely over it.

The measuring and changing of discs is a little more difficult than when the motor is fixed in position; some would perhaps on that account prefer the plan illustrated by Fig. 3, in which the motor is hung by two springs and is in a more stable position. For purposes of color-mixing, if this plan is adopted, it would be better to have the

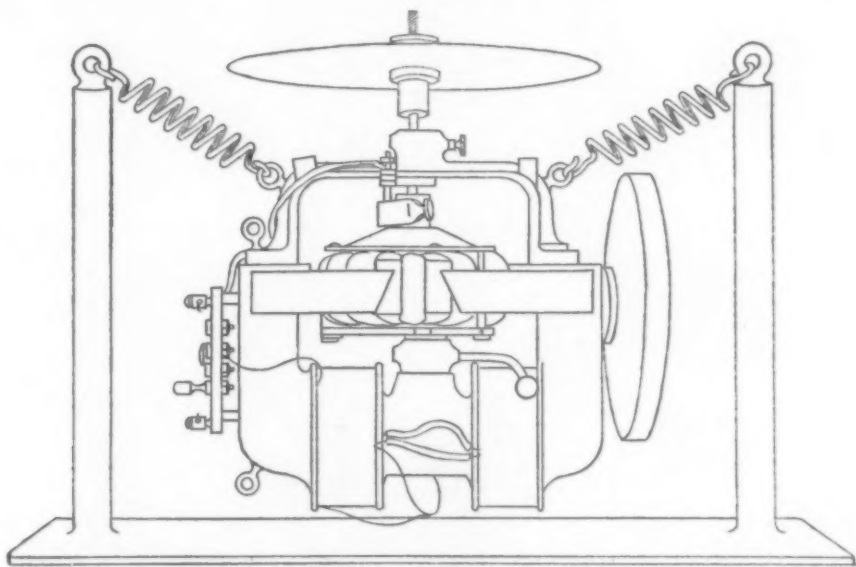


FIG. 2.

clamp part of the fixture turned half way around so as to make the arm project away from the table, especially if the table is broad.

Fig. 2 represents the mode of suspension for rotation in a horizontal plane, such as is necessary, for example, in mapping out the color fields with the aid of the campimeter. The position is stable and in every way convenient for the purpose it serves.

Fig. 3 represents one of the several possible applications of the plan of spring suspension in the case of motors used for running laboratory apparatus. The motor may be placed below or at the sides as well as above, as represented here; while the application of the

plan affords no special difficulties in any position, the position above is perhaps the most generally serviceable.

In any case, the thing important is to have the spring over the belt wheel of the motor a little shorter or stronger than the other, so

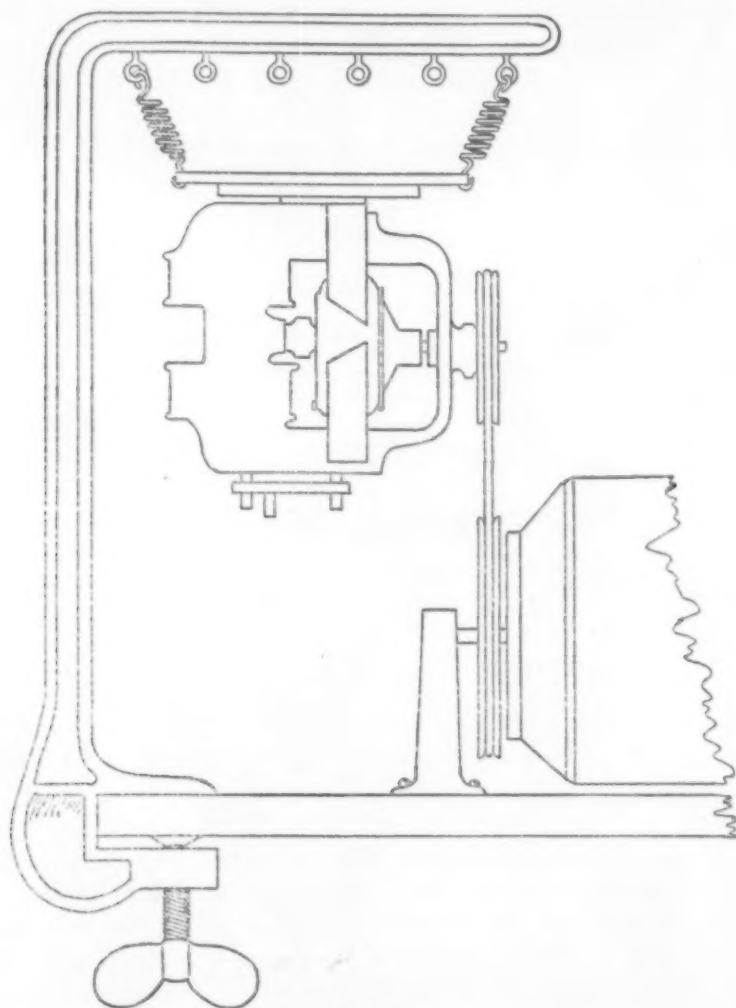


FIG. 3.

that this end of the motor must be pulled down an inch or so to bring the axis of the motor parallel with the axis of the apparatus which it is to run. The belt should be just long enough to keep the motor in this parallel position.

The arrangement does not merely reduce the noise, but, what may be more important in some cases, it largely prevents vibration and keeps the belt, which may be quite short, always tight.

Some reduction in noise and vibration may be secured by giving the motor a spring base; but the base will be comparatively rather stiff, and as good results have not been obtained with this as with the plan of suspension.¹

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¹ The MS. of this article was received November 17, 1904.—ED.

MEETING OF THE NORTH CENTRAL SECTION OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION.

A meeting of the North Central Section of the American Psychological Association was held in Chicago, November 26, 1904, in the building of the Northwestern University. Professor W. D. Scott, of Northwestern University, presided. Thirty-five persons attended the meeting. The following papers, presented by members of the association and others, were read and discussed:

ABSTRACTS OF PAPERS.

1. *Is Subjective Idealism a Necessary Point of View for Psychology?*

STEPHEN S. COLVIN, University of Illinois.

The speculative attitude of the psychology of to-day in regard to reality tends towards subjective idealism. The chief argument for this view is that the senses give us only a mediate, and hence inadequate, knowledge of externality. This argument can establish its contention as to the relativity of perception only by holding that certain perceptions are not relative. As an additional support to its thesis subjective idealism also holds to the proposition that we know only our individual conscious states. This may mean either: (a) I can have, as an object of direct, intuitive knowledge, only my past conscious states; or, (b) that in any mental state which I may possess my knowledge is limited to a content which is itself a part of that mental state. Both of these propositions, when analyzed, end in self-contradiction, and subjective idealism becomes an absurdity by reducing the mental life to psychic atomism.

2. *The Genesis of Meaning.* I. E. MILLER, State Normal School, Milwaukee.

The analysis of an act into the two phases, stimulus and response, is not a complete account of activity. It gives a cross-section view only. Studying activity in continuity, we see that out of the motor response arise new sensory experiences, which may in turn serve as new stimuli to still further action. Moreover, if the original stimulus recurs, the outcome of motor response can now be anticipated. Such anticipation of the outcome of motor response to a stimulus is meaning. Analysis of the state of consciousness concerned reveals it as

suffused with motor tendency. It is in a state of tension. It is undergoing a subtle species of disruption, the more immediate phase becoming symbol, the more remote, meaning. Symbol and meaning, evolving thus together, are strictly correlative.

3. *Relation of Sensation and Revived Mental Processes.* T. H. HAINES and J. C. WILLIAMS, Ohio State University. (Appearing in full in the PSYCHOLOGICAL REVIEW.)

The control of the visual after-image affords a unique case for the examination of the relation of sensational and revival processes to each other. The attention process is similar in the study of after-images and memory images. This paper exhibits experimental evidence of the interference of a voluntarily aroused subjective color impression (memory image) with the after-image.

How do these processes interfere? H, as observer, when trying to control the after-image, for a given color, often lost entirely the point of departure of the after-image and went on observing the play of colors for as much as a minute longer than the normal after-image ever lasted for him. The imagination product so nearly simulated the retinal product that it was mistaken for it, and this in an individual who is by no means a strong visual. There seems to be no doubt that the after-image is a retinal affair, and the fact of this so close similarity of the memory or revived image of color seems to us to indicate a retinal factor in its generation. The function of the efferent sensory fibers, so-called, of the optic nerve would bring this peripheral apparatus into play without objective stimulus.

4. *The Vehicle of Cognition.* B. H. BODE, University of Wisconsin.

According to Hume the atomic sensation is the sole vehicle of cognition; according to Kantianism sensation is not cognitive at all, except through the relating activity of thought. Kantianism rightly denies that sensation as thus conceived can be cognitive, but suffers from this misconception of sensation, which it borrows from Hume. This error is corrected by James, who in turn errs when he attempts, like Hume, to make sensation the sole mode of cognition. The attempt appears plausible, because relations without terms are substituted for the experience of relations together with their terms. Similarly Bradley and Bosanquet. In Stout's imageless apprehension due recognition is temporarily accorded to the idea. Sensation or image and idea are distinct modes or vehicles of cognition.

5. *Psychological Method.* C. A. BLANCHARD, Wheaton College.

There is a tendency in our time to make Psychology a chapter of Physiology. The nervous system and the psychic powers are intimately connected, hence some careless thinkers have identified them.

The subject matter of Psychology is known only by consciousness. No sense perception can attain either to mind or the products of mind.

The physical reactions of mind are unreliable, — they vary with the constitution of different persons, or with the physical state of the same person at different times.

Still further, if physical reactions were constant for all men at all times, the psychological observer who works through the senses is dependent upon the ability and disposition of the person to report correctly his psychic activities.

The method of introspective study of psychic phenomena by the individual, and comparison with the results of like study on the part of other men, is the only serious and complete method for the study of psychology.

6. *An Iowa Case of Complete Congenital Cataracts, in which Vision was Acquired by the Removal of the Lenses of Both Eyes after Twenty-two Years.* JAMES BURT MINER, University of Iowa.

Partial report was made of a few of the tests on Bertha R. Witmer. Miss Witmer's eyes were operated on in 1902 by Dr. W. L. Dean. Color discrimination was found to be about normal, in spite of the almost total disuse previous to the operations. The black square appears larger than the white of the same size. This reversal suggests that irradiation is mainly central, rather than peripheral. Probably it is due to the emphasis on dark instead of bright objects in the subject's experience before the cataracts were removed. Interrupted space seems shorter. It was suggested that this might be explained by the subject's difficulty in following a continuous line, which comes from the abnormal tendency of her eyes to twitch. The parallel-line illusions of Hering and Wundt are apparently not obtained in the usual manner. The Müller-Lyer arrow-illusion maintains. Contrary to medical opinion, hints of binocular vision have been obtained.

7. *The Relation of Psychology to Logic.* HARRIET S. PENFIELD, Rockford College.

8. *The Functional Theory in Psychology and the Concept of Transcendence.* J. H. FARLEY, Lawrence University, Wis.

Functional theories emphasize the dependent, the changeable,

and are correlative to dynamism in science and the tendency away from the identity of exclusion and unchangeableness in metaphysics. But these very theories often embody the identity of exclusiveness in the very concepts of movement, change and purpose. In so far as they interpret consciousness or thought in terms of the biological or mechanical movements as such, the union of the logical with the psychological event must remain only external, for every movement or change, considered as a biological or mechanical fact, is a completed movement. Every movement implies anticipation. The self active purpose alone realizes the concrete flow. In the life of depleted sense experience, the concept of definition must take the place of the completed and divorced abstractions of representativism, and in the perceptive life the notion of identification must supersede that of presentativism.

9. *The Psychology of Linguistic Development in the Individual.*
M. V. O'SHEA, University of Wisconsin.

The primitive cry of the infant has from the outset modifications for the trained ear, by which bodily needs and emotions are expressed. Expressional activity, reflex to about third month, appears in response to personal stimuli about fourth month. Vocal activity for first three months is limited to vowels, then labials, dentals, gutturals. Vocal play begins about fourth month, when the child accidentally hits the mark, others take it up and impress it so that he repeats it, with occasional variations but little true invention. At first the child in interpreting expression relies wholly upon gesture, facial expression and vocal timbre. Words as such are not reacted on before the eighth or ninth month. The first words used are 'sentence-words,' and have nominal, verbal, pronominal and probably adjectival function.

10. *Is the Beauty of Art a Higher Type than that of Nature?*
GEORGE REBEC, University of Michigan.

The paper is a criticism of the restriction of æsthetics to fine art; or, more directly, of the accompanying condemnation of nature to an inferior rank in beauty, and the assertion that art includes everything significant in nature, as well as more besides. The discussion is largely with reference to the Hegelian justification of this point of view. The questions raised are: Does the mind only imperfectly reveal its content in immediate perception (nature)? Does the deliberateness of art imply an enrichment of meaning-content? Is the fuller sensuous concreteness of nature a 'contamination' and a sheer hindrance to the mind's self-awareness? Incidentally also this, — Can we accept Bosan-

quet's definition of nature as 'the perception of the ordinary observer' ?
Conclusions: The greater concreteness of nature may be only an ampler power at least of *hinting* import; nature has advantages of magnitude, variety, and intensity, which even poetry cannot compete with; the very sense of reality, which goes with nature, constitutes an *æsthetic* superiority.

11. *The Reality and the Symbol in Education.* JULIA H. GULLIVER, Rockford College.

The truer the symbol the more organically connected it is with the reality it represents. In education the primary necessity is to understand the organic self we are trying to educate and not to substitute for it a dead abstraction as its false symbol.

If psychological analysis asserts that the soul reflects the growth of every part and organ of the body, that involuntary movement must precede and condition voluntary conduct, it follows that the healthy body so far from warring against the soul is to be regarded as its indispensable coadjutor.

The moral antithesis is not between soul and body but between the lower and the higher, the less and the more worthy, both physically and mentally.

12. *A Motor Theory of Rhythm.* R. H. STETSON, Beloit College.
[To be published in full in the *PSYCHOLOGICAL REVIEW*.]

PSYCHOLOGICAL LITERATURE.

PHILOSOPHY.

Elements of Metaphysics. A. E. TAYLOR. London, 1903. Pp. xvi + 419.

It is perhaps somewhat early to put into the form of a systematic work on Metaphysics the results of the very recent studies, however fruitful, of Mr. F. H. Bradley, Professor Royce, Professor Ward and their collaborators. Nevertheless, everybody will welcome Professor Taylor's clear and systematic treatment of metaphysical problems in the light of recent English and American philosophy. Not that the present volume is a mere digest of a certain school of thought. It is an independent and able work on general Metaphysics which no student of philosophy should fail to read and study. It illustrates, however, the new method in philosophy, whose progress depends no longer upon the brilliant utterances of one man, the so-called philosopher, but upon the collaboration of a large number of workers who themselves stand in close touch with the psychologists. The author makes due acknowledgment of his indebtedness to Mr. Bradley and to Professor Royce, as well as to Ward, Avenarius and Münsterberg. Among other writers often suggested for collateral reading, are Lotze, Mach, Bosanquet, Ostwald, Hobhouse, Pearson and Stout.

Under the threefold division of ontology, cosmology and rational psychology, the author discusses the metaphysical criterion and method, the nature of reality, substance, quality and relation, causality, matter, law, space and time, conditions of evolution, the logic of the descriptive sciences, soul and body, the self, freedom, and incidentally many other questions, such as the existence of evil, the personality of God and the immortality of the soul.

So far as the positive or constructive part of the work is concerned, we may say that its chief significance lies in the emphasis which is placed, first, upon the teleological character of everything, upon purpose, end and interest; second, upon the individuality of everything, and third, upon the social aspect of everything. Physical nature is a society or group of societies. Even the absolute may, without any serious error, be thought of as a society. Still more is the notion of individuality insisted on. The absolute is an individual, not however

'because it is numerically one, but because it is the complete expression of a coherent idea or purpose.' The so-called physical world is composed of individuals, whose reality is throughout psychical, characterized by the possession of purpose, desire, interests.

In the first part, on Ontology, the author attempts the ever-fascinating task of constructing a philosophy of being which shall be apodictical and not merely speculative in character and at the same time escape the absurdities of subjectivism and the fallacies of realism. With the principle of self-consistency as an infallible criterion, he proceeds to the search of that which really is, and, following Bradley, finds it in 'experience.' It is, of course, psychical matter of fact. It is essentially teleological and individual. As experience, it is not my experience nor the sum of human experience, but a superhuman or supreme experience, a conscious life embracing the totality of existence in a perfect systematic unity. As such, it may be called the absolute, which is defined 'as that structure of the world-system which any and every internally consistent purpose must recognize as the condition of its own fulfillment.'

In this brief notice, I cannot of course enter upon any critical examination of Professor Taylor's book. I wish only to refer to the author's exposition of the general doctrine that reality is 'experience.' Those who have been puzzled rather than convinced by Mr. Bradley's metaphorical and often contradictory statements of this view will turn with expectancy to Professor Taylor's clear and systematic treatment. Mr. Bradley himself says that it is only the completed system which in Metaphysics is the genuine proof of the principle. The 'proof' offered by Professor Taylor, however, will be found to be disappointing. After a critical introduction, in which the author, as metaphysician, devotes himself to the greatest of all problems by the most severe and rigid methods, by 'sheer, hard and continuous thought,' the result that reality is experience is gained so quickly and easily in a single chapter that the naïve reader, who has at the start no prepossessions in favor of 'experience' over the many other names given to reality since Plato and Democritus, is struck with amazement and turns back to read the chapter more carefully. He finds that the proof given is merely the Kantian argument that the difference between the 'real' and 'imaginary' is that the former is always the object of sentient experience, is indissolubly connected with the psychical life of a sentient subject. But this, of course, does not prove that reality is experience, but only that that which is real *for me* (or for us, that is, all possible sentient subjects) is the *experienced*. I am unable to see

how we are entitled to substitute 'experience' for the 'experienced' even if we grant the validity of the many arguments which the author urges in support of the immediacy of experience, since the Kantian principle upon which the whole proof is based involves just the distinction between subject and object. But I pass this to consider a more serious difficulty. It is in the ambiguity of the word 'real' that we have the gist of the whole difficulty or, rather, the key to the whole fallacy. The author says, "It is a philosophical blunder to identify the real with the merely 'independent' of ourselves. What is merely independent would be for us the merely unreal. Presence in immediate experience is a universal character of all that is real, because it is only in so far as anything is thus presented in immediate unity with the concrete life of feeling that it can be given as a condition or fact of which an individual interest must take account, on pain of not reaching accomplishment." This use of the word 'real,' as opposed to the 'imaginary' or 'merely possible,' is of course legitimate enough if a writer chooses to adopt it and stick to it. But it should be remembered that the use of the word through all the history of philosophy from Thales to the present has with few exceptions been something wholly different. It has reference to the real as opposed to the phenomenal. This is also the meaning of the word to every young student of philosophy who turns to Metaphysics to satisfy his longing to know what the great reality is which lies beyond the world as it appears to him. To such an inquiring mind, the seen is the unreal and the unseen is the real which Metaphysics seeks. In the above quotation from Professor Taylor, the seen is the real and the unseen the unreal.

Now if with Hodgson we define Metaphysics as the subjective analysis of experience, or explicitly limit it, as Mackenzie does in his *Outlines*, to experience as a whole, well and good. Then, possibly, 'reality' may be defined as experience and so far as reality in the larger sense is concerned these systems remain thoroughly agnostic. Students whose interests are purely psychological will no doubt read these books on the metaphysics of experience with appreciation, but the larger class of readers will turn away unsatisfied with this conception of philosophy and again take up their Plato, Plotinus or Leibniz.

But now Professor Taylor does not stick to this subjective sense of the word 'real.' His proof that reality is experience rests, as above pointed out, upon this narrower conception of reality, but otherwise throughout the book he uses the word in its common and larger meaning and his work is a straightforward attempt, quite as much as

any of the older works on Metaphysics, to penetrate to a knowledge of the world of reality beyond the world of appearance.

This purpose is definitely stated again and again in his introduction, and in general he opposes and successfully refutes both subjectivism and phenomenalism. The author's ontology is throughout, just what every system of ontology must be, a piece of speculative construction, and his attempt to give it a demonstrative form rests upon the fallacy mentioned. The same equivocation in the meaning of the word 'real' is seen in another form of the author's argument, which is virtually as follows: Since anything to be real must be experienced, and since it is idle to suppose that finite minds experience all that is real, we must suppose a superhuman experience, an absolute experience embracing all things.

I am unable to find in Professor Taylor's book any other argument that proves, or has to me any convincing force, that ultimate reality is experience.¹ In the interesting chapter on Matter, following Professor Royce, he develops the social argument in proof of the independent existence of our fellow-men and of an external physical order. The very existence of my own purposive life, he says, is meaningless apart from the existence of a similar inner purposive life of my fellow-men with similar aims, ideals, and beliefs, and these again cannot be understood without reference to geographical, climatic, economic and other conditions. Furthermore, the 'independent' existence of my fellow-men means existence as centers of experience, as feeling, purposive beings. Let us grant the validity of this reasoning thus far and notice what follows. "We have also seen that the grounds on which an 'independent' existence must be ascribed to the rest of the physical order are essentially of the same kind as those on which we asserted the 'independent' existence of our fellow-men. *It appears patent, then, that 'independent' existence must have the same general sense in both cases.* It can and must mean the existence of centers of sentient purposive experience." "What appears to us in sense-perception as physical nature must be a community, or a complex of communities of sentient experiencing beings." The paralogism here is in the sentence which I have italicized. It does not in any way follow because my fellow-men must exist as sentient beings to explain my own social nature, that my geographic and climatic environment must likewise

¹The reasons offered by Mr. Bradley appear equally inconclusive. He argues that as we cannot think of anything nor speak of anything except in terms of the experienced, therefore absolute reality must be experience. The connection here between the premises and the conclusion is not obvious.

be composed of sentient beings. The author admits that the types of experience with which we are dealing in physical nature are 'too remote from our own for detection,' which, he thinks, may account for the apparent deadness and purposelessness of so much of nature. One begins to suspect that what the word 'experience' means in Metaphysics is not what it ordinarily means, that it is a kind of *X*. This feeling increases when we find it spoken of as an 'absolute experience,' especially when we learn that the Absolute does not exist in time nor space, is not a self and does not develop. When an all-embracing unity which does not develop and is not a self is said to have or to be an 'experience,' it is evident that the word has a new or at least an indefinite meaning. Does it all amount to this, that the conception of the Absolute as 'psychical matter of fact,' while there can be no thought of demonstration, gives us that intellectual satisfaction at which Metaphysics aims? If so, the idea is certainly not new.

The strength of Professor Taylor's book lies not in his constructive ontology but in his clear and masterly analysis of general metaphysical concepts, such as substance, quality and relation, change and causality, space, time, law, soul and body, freedom, etc., and in the fact that the whole treatment is both modern and systematic. It will be an excellent text-book for classes in Metaphysics, of which there has been a great need.

G. T. W. PATRICK.

UNIVERSITY OF IOWA.

Deception and Reality. A. KIRSCHMANN. Amer. J. Psychol., XIV., 288-305.

The author attempts to show the inconsistency of the view that 'the world of the senses is a deception, an illusion, behind which stands a real world of entities unknown and imperceptible to us.' It is fallacious to try to reach from a deceptive world of the senses to a real world. "We must have the reality in order to be able to ask for it or to question it." It is, therefore, illegitimate to ask, What is the real? We should ask, Is there anything unreal? and, What is unreal? The deception in an optical illusion, in a mirage, or in a hallucination is not an inherent deception in the senses but it is due to the misinterpretation of the sensory impressions. More is read into the given data than they warrant, and hence the deception. Our sense impressions are real. Indeed, there is no opposite to the 'real' unless the 'real' is made identical with the 'true.'

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Voluntarism and Intellectualism. GUSTAV SPILLER. Philosophical Review, 1904, XIII., 420-428.

The possibility of reconciliation between the hostile camps of Intellectualism and modern Voluntarism, between the advocates of pure reason and the worshippers at the shrine of feeling and the individual will, is to be found in a more organic conception of human nature. Such a conception is, indeed, the natural outcome of a conflict which has brought to light the inconsistency and incompleteness of Intellectualism on the one hand and the dogmatism and anarchy involved in absolute Voluntarism on the other. The reasoned and organic Voluntarism, the purified Intellectualism if you will, advanced by the author is the expression of the element of truth common to both theories. The Intellectualist, the scorner of all aims save that of seeking the one permanent fact, the truth of natural science, must be brought to a realization of the impossibility of logically defending his position. The conceptions current at any given time may be traced to certain factors active in human history. Hence they may well be in some centuries predominantly scientific. In others again they will as surely be predominantly æsthetic or moral. What we believe, is conditioned inevitably by what we are naturally inclined to believe. Moreover the object of scientific research is not the fact as such, but the general truth sought, that superstition and fear may be banished and helplessness relieved. Its purpose is utilitarian. Plainly, then, we must go to that despised realm of the feelings, to some need seeking satisfaction for the origin of science. Intellectualism, further, while vaunting its impartiality has set up a standard of values for facts. It has confined its attention almost exclusively to those of physics and philosophy, ignoring psychology, ethics, sociology, æsthetics, education, religion, economics. Its fetich, too, the physical fact, is, in truth, but a product of mind. Our conception of the universe is largely determined by socio-utilitarian considerations. It is seen not as it is, but as our senses would have us see it. The absolute voluntarist on his side must recognize the limitations of his belief. Truth is *not* a matter of individual opinion. Government and society are based on the fact that truth is social. To see, or feel, or think very differently from one's fellows is to deserve the name of anarchist or madman and to suffer banishment. Truth, moreover, is natural. The individual who defies the conditions imposed by nature dies. Finally, each one of us is a self of *many* wills. As we are one with society, so the various needs within us must be adjusted until there is harmony—subordination of the lesser needs to the ruling principle of the organism. The

individual present ideal is neither right nor wrong per se. It is to be evaluated from the standpoint of a progressive social and moral ideal.

GRACE BRUCE.

VASSAR COLLEGE.

MEMORY.

Connected Trains of Thought. E. N. HENDERSON. Psychological Review, Monograph No. 23, 1904. Pp. iv + 94.

This monograph is divided into two parts, in the first of which there appears a review of such experimental work on memory as seems to have any significant bearing on educational questions. It discusses previous investigations into the growth of memory with increasing age, sex differences in the development of memory, the value and limits of repetition in committing to memory, and the influence of the character of the material, of the method of memorizing, of rhythm, and of various kinds of distraction upon the power to remember. Nearly all of these studies have considered only the ability to retain disconnected material. In the school, however important such retentiveness may be as a fundamental power upon which mental efficiency rests, it is evident that what is appealed to and developed is the memory for organized material. The study, an account of which constitutes the second part of the monograph, is concerned with this. The material employed comprised a condensed fable, a character sketch of Cicero, an historical outline, a description of a house, and a passage from the philosophy of Comte. Each selection contained from 125 to 180 words. The experiments consisted in having a class of students commit to memory as much of one of these passages as could be done in three minutes. The result was then written down. Two days later the class was asked to make a second reproduction, and after a lapse of four weeks a third. An endeavor was made to insure that there should be as little thought as possible on the passages in the intervals between the successive reproductions. The students were, if they could, to make a literal reproduction. Otherwise they were to give what they remembered of the thought. The subjects included classes of boys from a grammar school in New York City, mixed classes in a high school in Brooklyn, undergraduates in Columbia College and graduates in Columbia University. The latter class of students worked with three of the passages.

The three reproductions were compared as to amounts of forgetting both in ideas and words during the various intervals. It was found that in general those who learned most of the passages in the given

time retained in the later reproductions a larger percentage of what they had learned than the others. On the whole, then, quick learners are good retainers. With advancing age very slight increase in power to learn was noted. Even less increase in power to retain appeared. The growth in both powers seemed due to better methods of committing to memory and greater comprehension of the material learned. Rank in school work correlated very little if at all with success in the tests. The students who took several tests attained in each about the same rank in power to learn. In power to retain the ranking varied more widely, due, it seemed, to the familiarity of the student with the general thought of the different passages.

A careful study was made of the character of the changes from the original reproduction in the later ones. It was found that the tendency is to remember something from each of the important topics and to forget some of the details in the elaboration of these. A general meaning is left in mind that constitutes the bond of union in the connected material. The act of recall was described by the older students as a process of unfolding such a meaning. It involved regrouping of the original topics and various sorts of modification. All the topics were vaguely in the mind at once, and this recall was quite different from the serial repetition of mere mechanical association. The paper endeavors to sketch the process of generalization as illustrated in the evolution of this general meaning that in the mind of each individual represents the passage he has learned.

THE AUTHOR.

SPACE DISCRIMINATION.

La mesure de la sensibilité. A. BINET. *Année Psychologique*, 1903, IX., 79-128.

Is the threshold of sensibility determinable? Or is the determination rendered impossible by the complexity of the judgment upon which it depends? Binet attempts to solve this problem through an investigation of the tactual discrimination of points, since this mode of sensibility has been already more worked upon than has any other.

He accuses psycho-physiologists of using and confusing 'sensibility' in two significations, viz.: (1) The ability to discriminate objects in our environment, in particular, 'stimulations.' In this acceptance the measure of sensibility applies directly to the physical force which is the excitant, and not to any mental phenomenon. We measure the physical intensity (initial threshold) or physical differ-

ence (difference threshold) corresponding to a definite judgment, but there is no implication of a measure of judgment itself. (2) The second signification of 'sensibility' is the collective group of sensations produced by the excitations. The measure of sensibility under this acceptance becomes a measure of sensation, which depends on the questionable hypothesis that sensations have intensity and are quantitatively comparable. In the problem he proposes for solution he takes sensibility in the first acceptance only.

As regards tactual sensibility, Binet objects to the terms 'Raum-sinn' and 'Ortsinn,' because both *Ort* and *Raum* refer directly to space. He therefore proposes 'discrimination' and 'localization' as preferable terms, because in the mere discrimination of points we need assume no real space judgment.

He confines his investigations to two-point discrimination, excluding localization and in most cases the third possible topic, viz., judgment of distance separating two points. With a rather full account of the work of Weber, and references to later work, he proceeds to state the conditions of his own experiments.

By use of an instrument in which the two points are attached to independent pieces of metal of equal weight, sliding freely in a vertical frame, Binet secured equality of pressure; by observation of the positions of the sliding members at contact, he detected errors in simultaneity; and by observation of an indicator moved by an air vane attached to the instrument, he detected variations in rapidity of descent and consequent force of impact of the instrument.

On account of the defects in ordinary psychological methods, Binet employed a 'method of irregular variations' elaborated by himself and Victor Henri. This method consisted of the arrangement of a series ranging by regular steps from the minimum to the maximum of differences employed, but in which the terms succeeded each other irregularly, although each one was given the same number of times in completing the series.¹ This method combined the merits of the method of minimal change with the lack of suggestion and the superiority in practice afforded by the immediate sequence of large and small members. Experiments on a number of school children demonstrated signally its superiority.

The exclusive use of laboratory students as subjects is objectionable in Binet's estimation, since their knowledge of the conditions and objects of the experiment makes them liable to suggestion in high

¹ This method is not entirely novel. See *Harvard Psychological Studies*, Vol. I., p. 103.

degree. Hence he employed professional men, ladies of various ages, school children, servants, artists, and blind persons, as well as laboratory students. In order to keep track of all conditions which might influence the subjects, all that took place during each séance was taken down stenographically. The forms of response were not dictated to the subjects as is the case in the German method; thus ambiguity was avoided.

To guard against distraction the judgment was in some cases complicated; *i. e.*, the subject was required to judge the distance of the two points if there were two perceived. Careful tests with one subject showed that this complication reduced the number of errors. Moreover, the declaration of different distances for different actual distances tends to guarantee the precision of the discrimination, while the declaration of uniform distance for different actual distances throws suspicion upon it.

The results of the experiments along the lines laid down are given in the succeeding articles of the series of which this is the first, and particularly in those entitled, '*Influence de l'exercice, etc.*,' and '*Le seuil de la sensation double.*'

KNIGHT DUNLAP.

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Influence de l'exercice et de la suggestion sur la position du seuil.

A. BINET. Année Psychologique, 1903, IX., 235-245.

The investigations here described confirm those of Tawney in regard to the effect of practice upon tactual discrimination. Binet agrees that suggestion plays an important part when the threshold decreases after practice, but he would add that the subject, while under the impression that his threshold is going to be lowered, makes an increased effort to analyze his sensations. This conclusion is confirmed by the increasing number of Vexirfehler after practice, noted by Tawney as well as by independent observations. These observations cover the complete training of two subjects and the partial training of others, all of whom were ignorant of psychology and of the results to be anticipated, so that the factor of suggestion was minimized.

The training of the first of these subjects was accomplished without any suggestion or explanation from the experimenter. Four stages of development are described. First, the initial attitude, covering the first three sittings, and marked by a high threshold and few mistakes. Second, increase in the number of answers 'two' for the single point or minute distances between the points. Third, preponderance of answers 'two.' Fourth, fewer answers 'two' for the single point.

The subject developed, spontaneously, the notion that her sense of touch ought to improve, and must have been influenced by that suggestion, but Binet attributes the development primarily to a change of attitude, from candid observer to analyst.

The other subject showed the same change of attitude, but the process through which the change was effected was entirely different. As in the first case, the subject started out with a high threshold and no errors for the single point, but she showed no tendency to improve, even after elaborate instruction in the construction and operation of the esthesiometer. The change of mental attitude was only brought about by giving a reprimand on the occasion of each failure to perceive the two points as separate. Under this stimulus the subject became what Binet designates an interpreter. The threshold was immediately lowered, the number of answers 'two' for the minute distances increased, and the Vexirfehler became numerous. That the decrease in the threshold for this subject was not the result of increased sensibility of the skin is shown by the fact that the estimates of the distances between the points were the same for the three distances 15 mm., 10 mm., and 5 mm., indicating that those distances were not distinguished from one another.

The conclusion is that purely psychological causes can effect an apparent modification of the subject's sensibility, and a warning is sounded against overlooking circumstances in the laboratory which may largely influence the judgments formed by the subjects.

Le seuil de la sensation double ne peut pas être fixé scientifiquement.

A. BINET. *Année Psychologique*, 1903, IX., 247-252.

Binet makes use of his division of psychological 'subjects' into two groups, 'les simplistes' and 'les interpréteurs,' to prove that the determination of the threshold for the discrimination of separate points on the skin is not possible. For as the result of practice all members of the first group — *i. e.*, those who answer directly with regard only to the objective stimulus — tend to pass over to the ranks of the 'interpreters' who have no determinable threshold. Those who have published numerical values for the tactual threshold must have taken only the first few determinations or have neglected the answers 'two' for the single point, according to Binet, for if all the answers are recorded and the investigation continued long enough, the threshold always becomes indeterminable. The threshold is not directly measurable and is not of great value to psychology because it is only the sign of subjective states which are not equivalent. That is, the words 'one'

and 'two' have different meanings according as the attention is fixed exclusively on the external stimulus or in part upon the sensations experienced. As long as the interest of the subject lies mainly in the stimulus as such his threshold will be high; he will distinguish quickly the object which seems single. But when he begins to analyze more closely he detects differences in the sensations which at first appeared to arise from a single object. This is interpreted to mean that some of the single objects are really double. This interpretation may be reached only after suggestions have been received or it may be spontaneous, but in either case the result is a decrease in the threshold. That this decrease is not due to increased sensibility from practice is demonstrated when we know that a mere verbal explanation of the apparatus is sufficient to produce it.

The considerations which lead Binet to proclaim that the determination of the threshold is impossible in practice are twofold. First, 'it varies from moment to moment, and the more it is sought, the more difficult is it to discover.' Second, 'even in the cases where it seems to have a definite position, it is related so closely to the method of interpreting sensations that we cannot be sure that it represents the degree of acuity of the organ.'

WARNER BROWN.

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AUDITORY DISCRIMINATION.

Untersuchungen über die akustische Unterschiedsempfindlichkeit und die Gültigkeit des Weber-Fechnerschen Gesetzes bei normalen Zuständen, Psychosen und funktionellen Neurosen. Dr. G. A. HOEFER. *Zeitsch. f. Psychol. u. Physiol. der Sinn.*, 1904, XXXVI., 269-293.

This paper refers to a more detailed treatment in the *Psychiatrische en Neurologische Bladen*. Its chief interest centers in the application of the difference threshold for different sound intensities and the method of right and wrong cases to neuro- and psychopathic individuals. A single drop phonometer with a zinc plate was used; but even with the use of the latter it was not possible to eliminate all differences in timbre. Five heights (from 325 to 1,300 mm.) were tested in 100 single experiments in a series. Fechner is followed in the matter of distributing the equality judgments equally among the right and wrong cases. This procedure, which, as the author observes, is at variance with American practice, is justified, in the reviewer's opinion, by his results: 34 per cent. of equality judgments, which

sustained no regular relation to the D used, and 28 per cent. of doubtful judgments. This uncertainty comes from the momentary flagging of attention and the indistinctness, in spite of maximal attention, of the sensation difference.

The following summarizes the conclusions :

An absolute impression of the first stimulus is possible, fully 50 per cent. of the right judgments being based upon such impression, but not of the second. There can be no absolute impression of a stimulus preceded by another.

The h -value remained fairly constant with the same stimulus for the different D (with the notable exception of the shortest distance) in accordance with the theory; it decreased with the increase of G ; it was greatly reduced by fatigue, but was far less influenced by depression when the observer had enough control to be attentive; it was constant, as a rule, for both D and G in epilepsy and dementia hebephrenica, for G in dementia paralytica and paranoia chronica, for D in melancholia and mania, but not for D and G in neurasthenia and hysteria, nor for D in paranoia and G in mania; but the number of patients for some maladies was very limited. Of special importance is the fact that the absolute value of the difference threshold was not, as a rule, subnormal.

Sundry time errors appeared (p. 288), but strangely these disappeared when the interval between the stimuli was more than doubled (6 sec.); they were positive only with G 650 mm., waned 'for the same G with the same D ,' diminished with practice, and were both positive and negative for some of the maladies.

The value representing the crucial test of the Weber law, the product of hG , indicated that it was approximately constant with the larger D only.

J. E. WALLACE WALLIN.

PRINCETON UNIVERSITY.

REACTION TIME.

A Study in Reaction Time and Movement. THOMAS VERNER MOORE, C.S.P. Psychological Review, Monograph No. 24, 1904. Pp. iv + 86.

The primary problem in this piece of research is not that of reaction time itself, but the relation between the time of reaction and the speed of the movement with which the subject reacts. The movement selected for reaction was an outward rotation of the *humerus*,

the arm being bent at a right angle near the elbow, and supported in specially constructed apparatus. The speed was measured by the time taken to pass through a given angle, usually twenty degrees.

When the subject was uninstructed as to the speed of the movement, it bore no constant relation to the time of reaction. When told, however, to react with the fastest possible movement, the time of reaction was subject to the usual variations, but the movement time was very regular. The attempt was then made to affect the time of movement by disturbances of the attention which are known to vary the reaction time, such as variations in the interval between the preparatory signal and the signal for reaction, and the total lack of any preparatory signal. Such disturbing influences affected the reaction time, but not the movement time. The effect of carrying on a process of addition during the series of experiments was in general to lengthen the time of movement. In the case of a compound reaction of choice, the movement time, as well as the reaction time, seemed to vary according to the direction of the attention to the speed of movement or the signals for reaction. No considerable difference was found between the speed of the quickest possible voluntary movement and that made in response to a stimulus for reaction. The effect of continuous sensory stimuli during a series of experiments was to lengthen both reaction time and movement time. An intermittent sound, however, lengthened the reaction time without appreciable effect on the movement time. A very loud signal for reaction accelerated the movement time. A graphic curve of the movement showed an accelerated velocity up to a point where it passed into a straight line, indicating a constant velocity.

The attempt was then made to bring these empirical conclusions into relation with more general psychological problems. The facts discovered as to the speed of movement in its relation to the fluctuations of the attention and sensory stimuli were more fully developed; and an attempt was made to criticise Professor Münsterberg's 'Action' Theory, according to which attention varies as the motor discharge connected with the ideas on which it is focused. The empirical results also appeared to indicate that the motor center employed in sensory reactions is not the *cerebellum* or any subcortical center, but the cortex itself. Neither the Wundtian nor the 'type' theory of simple reaction was criticised; but the assumption was made 'that when the strain of attention is really in the efferent circuit' the subject reacts in the so-called muscular manner.

THE AUTHOR.

Zur Frage nach der Fortpflanzungsgeschwindigkeit der Erregung im sensiblen Nerven des Menschen. F. KIESOW. Zeitsch. f. Psych. u. Phys., 1903, XXXIII., 444-452.

Ein Beitrag zur Frage nach den Reaktionszeiten der Geschmacksempfindungen. F. KIESOW. Ibid., 453-461.

Reaction-time methods of the usual sort were employed in both of these investigations. In the first series simple motor reactions of the author himself were taken when the stimulus was applied first to the lower arm and then to the upper arm, or in like manner to two parts of the leg. The difference in the two reactions to arm stimulations was assumed to be due to the time consumed in conduction of the sensory stimulation along a section of sensory nerve equal in length to the distance between the two points. In like manner comparison was made for the two points on the leg. The results show an average rate of conduction along the arm sensory fiber of about 30 meters per second. For the leg the results average a rate of about 33 m. per second.

The second investigation deals critically with earlier results of taste reaction-times on the basis of the author's own results. Taste times range with the author from 307 to 1,081 sigmas. Short times, such as 140 sigmas, reported by v. Vintschgau and Hermann, are criticised as doubtless simple motor reactions to touch rather than true taste reactions.

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WORK AND FATIGUE.

Untersuchungen über psychische Hemmung. Art. III. G. HEYMANS. Zeitschr. f. Psychol. u. Physiol. d. Sinnesorg., 1904, XXXIV., 15-28.

This article is on the inhibition of auditory perception through cutaneous perception. The observer listens for five minutes to the ticking of a clock a short distance from him. At the same time he dips the fingers of the left hand into a pan of water in circuit with an electric current whose strength may be varied according to definite gradations. With the right hand he indicates how long during the five minutes he hears the clock. The experiment shows that an increase of the electric current (cutaneous stimulation) is accompanied by a decrease in the perception of the auditory stimulation (ticks of the clock), and that a more or less definite functional relation exists between the two.

Intervall und Arbeit. W. SPECHT. Archiv f. d. Ges. Psychol., 1904, III., 1-32.

The problem is, what is the effect of the 'interval' (length of time between the warning signal and the work signal) upon the time and type of reaction? Eight such intervals were chosen differing in length by one quarter of a second, the shortest interval being one quarter of a second and the longest two seconds. The reaction consisted in lifting a 5 kg. weight with the middle finger of the right hand. Of the two observers, one showed a uniform increase in the time of lifting the weight with the increase of the interval. In the second observer this relation holds only for the larger intervals. A second series of experiments in which the interval was constant (one second) and the weight varied, shows that for both observers the time of action increases as the weight increases.

Ueber klinische Ermüdungsmessungen. I. Teil: Die Messung der geistigen Ermüdung. W. SPECHT. Archiv f. d. Ges. Psychol., 1904, III., 245-399.

This study presents a comparison of normal persons with individuals suffering from traumatic neuroses, for the purpose of demonstrating a clinical method of diagnosis by a fatigue test. The tests consisted in the addition of figures according to Kraepelin's 'Pausenmethode.' The observers added figures continuously for ten minutes with and without a pause, or rest, on alternate days. This brought out the effect of rest and practice. In the first series of experiments normal observers of both sexes and of different ages and grades of education were employed, while in the second series neurotic patients were employed. Dr. Specht found that the normal and the abnormal persons gave different types of work curves. A comparison of the two types shows that the neurotic patients are far more subject to fatigue (Ermüdbarkeit) than normal persons, that they are much less capable of regaining strength (erholungsfähig), that their capacity for work (Leistungsfähigkeit) is considerably decreased, and that, however, their capacity to improve by practice (Uebungsfähigkeit) is not very noticeably diminished, although it is much less permanent.

DANIEL STARCH.

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Ueber Ermüdungsmessungen. EMIL KRAEPELIN. Archiv für die Gesamte Psychologie, I. Band, 1 Heft.

The author aims to give a review of what has been accomplished

by way of measuring fatigue. He expresses his long cherished hope that psychological investigations might be made practically useful, which for him means especially in the field of mental diseases. Psychology must not remain the hobby-horse of the learned. The problem of measuring fatigue involves two things: the determination of the effects of different kinds and durations of work upon different persons and upon one and the same person. This is to be done by measuring the amount of work done or noting the effect upon a test given before and after the work whose effect is to be measured.

Practice, changing conditions of the subject, the selective nature of fatigue in showing itself in one kind of work and not in another, psychomotory excitement of some kinds of work, are factors to be reckoned with in measuring work capacity. Psychomotory activity is a poor test of fatigue. The methods of Griesbach and Kemsies are discredited and discarded. Laboratory methods in general are unusable for school tests and entire classes should not be used; selected pupils should be taken instead. The principle governing the study of personal fatigueability is that the fundamental peculiarity comes out in all work in the same way. The problem becomes complex through the interrelation of practice and fatigue. The effects of practice cannot be measured alone. The method of the most favorable pause alone gives results and these are not wholly satisfactory. A further factor is incitation. Caution against mass experiment and hasty work is reiterated with great emphasis. The discussion is based mostly upon researches made in the author's own laboratory. The chief value of the paper lies in showing how complex the problem is and how difficult it is to win trustworthy results.

T. L. BOLTON.

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MOTOR FUNCTIONS.

La Mimica del Pensiero. SANTE DE SANCTIS. Milan, 1904. Pp. 208.

This interesting little treatise is by the author of an important works on Dreams (*I Sogni*, Turin, 1899). He says that hitherto experimental psychology has investigated conative attention, *i. e.*, attention artificially provoked and maintained, here is an attempt to measure natural attention, *i. e.*, the capacity of a subject to attend to the ordinary happenings of life. In the passage from a state of indifference to that of attention, as marked by changes in the sense organs, the vegetative and motor functions, use has been made of the

plethysmograph, the cardiograph, etc., while but little has been done to record the imitative movements. Some have claimed that the motor activities accompanying attention constitute the attention itself; others deny that they are equivalent. The physiologists incline to a mere analysis of the phenomena of mimicry, the psychologists to a search for the bio-physiological laws. This study confines itself to intellectual mimicry by a comparative study of photographs and kinetoscopic views.

Chapter I. deals with the relations of emotional and intellectual mimicry. Contrary to the view that the act of ideation is not in itself an effort but simply the preparation for an effort (Angell and Thompson) is the principle of psycho-physical parallelism, that there is no thought without some objective sign, some harmonious combination of affective and intellectual elements. In certain abnormal cases among degenerates and psychasthenics there may appear to be affective states without intellectual motive, but such are merely temporary points of indifference where the psychical and physical forces diverge. The description in Chapter II. of the muscular and nervous structure of the face shows that there is a specific expression for thought which has had an evolution not only from the anthropoid to the human type but from the lower to the higher. This expression in man has its principal location in the ocular imitative zone and chiefly though not exclusively by means of the supraciliary muscles. According to Chapter III. the intellectual mimicry of animals is shown by a general posture of attention, this being an attenuated form of emotional mimicry. But not even the primates here possess a definite center, for some are of the auditory, others of the ocular type of attention. In all animals the signs are diffused, radiating from the head and throughout all the body, unlike man where the activity is limited to a small muscular zone of the face. In these diverse localizations there is an evolution disclosed. From diffusion, where the representative elements predominate over the affective, there is a tendency to immobility which, if persistent, indicates mental effort as shown by inhibition of motion. Among children, as shown in Chapter IV., concentration of thought is mainly sensorial, and more passive and reflex than among adults. It takes the form of primary attention (Ladd) or presentation (Titchener). Tentative experiments with children make attentive mimicry to be a continuation of reflex mimicry provoked by optical stimuli. Among the aged the contrary holds true: attention is weaker than in youth, and the facial expression tends to become stereotyped. From the reflex character of attention in infants and

the adaptation of the visual organs there is developed the center of attention, *i. e.*, intellectual mimicry has a sensorial origin. Through an association of habits visual mimicry, which is fundamental, develops along with the auditory and tactual senses, but when self consciousness arrives there is a certain degree of functional independence. Chapter V. presents a synoptical table of muscular and sympathetic movements in acts of attention, a series of photographs of the frontal muscles, and a study of the expression of the emotions in art. Here the phenomena are anomalous, being often asymmetrical.

Dealing with concentrated thought, in Chapter VI., the types are said to vary with the nature of the object, the habits of the subject and with the degree of intensity. Diffuse thought is characterized by a minimum of force and of the affective elements and by weak states of consciousness and of will. Ecstasy is analogous to hypnosis (Leuba), but mystic reverie is far from giving a maximum concentration of spirit (James). The modifications of intellectual mimicry are due to race, sex, habits and age, the maladies to lesions of the facial nerves or to neurasthenia. Experiments with the deaf, as disclosed by elaborate tables of both spontaneous and commanded acts of attention, lead to the hypothesis that intellectual mimicry is not so much hereditary as an individual acquisition, a transformation of a sensorial reflex. In fine, the origin of the matter lies in the reactions defending the organism from excessive stimuli and in the adaptation to useful and pleasurable stimuli (Baldwin).

I. WOODBRIDGE RILEY.

NEW HAVEN, CONN.

La graphologie et ses révélations sur le sexe, l'âge et l'intelligence.

A. BINET. *Année Psychologique*, 1904, X., 178-210.

M. Binet here gives the results of tests to which he has subjected two French authorities in graphology, M. Crépieux-Jamin and M. Eloy, as to their ability to determine sex, age and intelligence from handwriting. One hundred and eighty addresses, eighty-nine written by women, ninety-one by men, were submitted to the experts and to lay people with the request to say whether they were written by men or women. The experts were correct in 78 per cent. and 75 per cent. of the cases, the inexpert in from 66 to 73 per cent. of the judgments. When questioned as to the criteria of differentiation, the experts could give no definite grounds for their conclusions.

M. Binet quotes from an unpublished manuscript of M. Bertillon some statistical results which show that certain forms of letters are

more frequent in the writing of one sex than another in a proportion of from 5 to 7 to from 1 to 2, but the results contain nothing that would guarantee an absolute determination.

Age and intelligence come off even worse. The average mistake in determination of age by M. Crépieux-Jamin was ten years. The results on intelligence were entirely negative.

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DREAMS.

Contribution à la psychologie du rêve. H. BEAUNIS. Amer. Jour. of Psych., Vol. XIV., Commemoration Number, p. 7.

M. Beaunis has made observations upon his dreams the greater portion of his life. During this period the subjects of his dreams have followed generally his habitual occupations. The dreams that come between sleeping and waking are the only ones that are remembered. In this transition stage impressions come somewhat feebly and vaguely and there is a kind of half conscious torpor in which images appear. Dreams resolve themselves into three classes; those of initial excitement, of memory and of irradiation. Dreams of memory are due to variations in the pressure or composition of the blood, which acts directly upon the cerebral centers. The affective sentiments appear in the dream in an attenuated form. The pleasurable sentiments remain vivid. His dreams keep his actual personality and there is consciousness of self. He maintains that one can in dreams be conscious that he is dreaming, and that reason, judgment and comparison often show themselves, but the will never does. Visions are only dreams prolonged. Dreams have played an important part among both primitive and ancient peoples. Beliefs in survival after death and in a future life had their germs in the dream.

M. EDITH WALKER.

UNIVERSITY OF NEBRASKA.

GENERAL.

Psychology and Common Life. FRANK SARGENT HOFFMAN. New York and London, Putnam's Sons, 1903. Pp. viii + 286.

The aim of this volume seems to be to give a popular discussion of some of the facts of psychical research, in preparation for which there are some introductory chapters on the relation of the brain to intelligence, and on attention and memory. Then follow chapters on hallucinations, sleep, hypnotism, the relation of the mind to disease,

the healings of Christian science and the miracles of Lourdes, telepathy and the so-called secondary self.

There is nothing in the book that is new to the psychologist, but it is nevertheless to be commended for its attempt to give in simple language for the lay reader the scientific explanation of many of the things usually shrouded in mystery. It is unfortunate, however, that such a professedly scientific work should be marred by many inaccuracies of statement. Some of these may be typographical errors, but in any event they are gross. To mention only two at the very beginning, on page 12 Professor Donaldson is referred to as if he were at present at Clark University (spelled Clarke!), and on page 13 Helen Keller is said to have been blind, etc., since her eighth year only.

IRVING KING.

PRATT INSTITUTE.

The Theory of Advertising. WALTER D. SCOTT. Boston, Small, Maynard & Co., 1904. Pp. 240.

This volume, though addressed to the practical world of advertising, bears as its subtitle, 'A Simple Exposition of the Principles of Psychology in their Relation to Successful Advertising.' The volume contains chapters bearing such familiar titles as attention, association of ideas, suggestion, perception, mental imagery. Professor Scott has thus presented advertising as a problem in applied psychology. As in all applications, there is a constant reference to the theory which is here very sensibly and forcibly applied, and also an equal reference to the needs of those who wish to use what a scientific analysis approves. This Janus-faced point of view leads to some unavoidable incongruities; but no one who has attempted work in the field of applied psychology will fail to appreciate how creditably the task is here accomplished. The several factors upon which the advertising reaction depends are clearly analyzed and carefully illustrated. It is possible that the psychology of the purchaser or the individual aimed at in the advertisement, is not adequately considered. One would be tempted to modify the title to read 'The Psychology of the American Advertisement,' as it is not unlikely that very different methods and formulæ would be needed in a different environment. It is, however, mainly to call attention to the existence and the value of this monograph in applied psychology that the present note is written.

J. J.

CHILD PSYCHOLOGY.

The Child, his Thinking, Feeling and Doing. AMY ELIZA TANNER. Chicago, New York and London, Rand, McNally & Co., 1904. Pp. 430.

In Dr. Tanner's *The Child*, we have a résumé of the child-study literature and, without doubt, it is the most complete, systematic and painstaking work of its kind extant. Such topics as these are treated: the problems of physical growth and abnormality; the feelings and ideas of sex; the mental processes; religious and moral ideas; emotions; interests; movements; imitation; language; rhythm; music; drawing and play. At the beginning of each chapter are definite suggestions for collecting data along the line of the chapter. The bibliographies at the close of each chapter are most ample. The author does not usually state the exact source of the data discussed, it being the purpose of the book to present an account of the child for 'the mother and teacher who have little access to libraries.' The author has not desired to draw conclusions or work out any theory, but to furnish the individual observer with a background of the results of the observations of others.

The criticism will naturally be applied to this book that has already fallen on much of the material with which it deals.

It is hardly necessary here to go into details which are familiar to every one who has followed the current literature of the subject. One often feels, however, the need of some background of theory as he peruses the book. In the midst of so much detail, the reader harbors the suspicion that some of it must be of more value than the rest — but which? There is no guiding suggestion; nor is any general meaning given to anything — to be sure intentionally — and yet there are a plenty of detached, fanciful interpretations.

The obvious conclusion from the very questionable study of Dr. Hall's on the Contents of Children's Minds, is certainly not 'that it is useless to try to teach a child about thing until he knows the things themselves' (p. 93), but rather the commonplace that he is ignorant of all that has transcended his experience. Far from its being one of his disabilities on entering school, it is the very occasion of his going to school. Why should he go if not to learn about these very things?

When we are told (p. 345) that 'in children from six to nineteen years of age, the least sensitive age is six, when the least perceptible difference of two tones is about a quarter of a tone,' we wonder whether the introspection of a child of six is sufficient basis for such a

generalization. So also as regards drawing — the fact that 'one child drew twenty-six Johnnies, in Johnnie Gluck in die Luft' (p. 384) does not necessarily prove that he thought in small units and failed to grasp the situation as a whole, but simply that he got started to drawing Johnnie and liked it so well he forgot the rest and kept on doing it, or perhaps he didn't find out there was any thing else to draw.

It is to be regretted that so much space should have been assigned to material collected under small sense of the necessities of scientific method. It is likewise unfortunate that the *naïve* statistics of the Clark University type, with the complacent deductions therefrom, should have been so largely used.

But these are only suggestions and we would not have them reflect upon the work as a whole, which is certainly unique in its sphere, presenting in convenient and readable form a vast amount of information regarding child life. It should meet with great favor at the hands of those for whom it was written.

IRVING KING.

PRATT INSTITUTE.

VISION.

On Binocular Flicker and the Correlation of Activity of 'Corresponding' Retinal Points. C. S. SHERRINGTON. *British Jr. of Psychology*, 1904, I., 26-60.

Professor Sherrington's main problem is the nature of the 'tie' between corresponding retinal points — the point in the psychophysical process where the effects of binocular excitation intercommunicate or conjoin. The experimental evidence is based chiefly on a comparison of symmetrical and asymmetrical binocular flicker and summation. If the nervous impulses from the two retinae were united early in their course it would seem that alternating, intermittent stimulation of corresponding points ought to involve less flicker than synchronous intermittent stimulation, while the effects of synchronous flashes of light on corresponding points ought to summate. Neither of these hypotheses corresponds with the facts, and the author concludes that "during binocular regard of an objective image each uniocular mechanism develops independently * * * a sensual image of considerable completeness. The singleness of the binocular perception results from the combining of these uniocular sensations: it is the product therefore of a psychical synthesis that works with already elaborated sensations. Such synthesis lies obviously more within the province of study of the psychologist than of the physiologist." The author's rotating binocular lantern gives a series of flash-lights from superposed

revolving turrets, projected through a revolving screen, and viewed through prismatic lenses. It is an ingenious arrangement capable of accurate adjustment and adapted to a wide range of experimentation wherever prisms are permissible.

The Sensations Excited by a Single Momentary Stimulation of the Eye. W. McDougall. *British Journal of Psychology*, 1904, I., 78-113.

Intrinsically as well as with reference to his elaborated scheme of the visual processes, McDougall's observations of the sensation pulses and allied phenomena consequent to the momentary stimulation of the retina are of marked interest. The mutually conflicting accounts of previous observers arise from the limitations of their methods and the diverse character of the sensation according to the brightness, form, rate and mode of movement of the stimulus, as well as to the state of adaptation of the eye, and to the part of the retina affected. The paper presents a systematic study of these conditions. The writer finds that the result of every momentary stimulation of the retina is a series of pulses of sensation of diminishing intensity. Except in some peculiar cases, the initial series of sensation pulses arises from the cones, while the terminal pulses arise from the rods. The ordinary after-image, succeeding the pulses, is due to 'the continued action in the rods and cones of exciting substances liberated in them by the action of light upon stored mother-substances.' This is evidenced by the cumulative character of the after-images. They grow brighter with each successive moment of stimulation. The last of the series of pulses is Bidwell's ghost. This is usually a pure rod phenomenon. Its appearance of detachment from the rest of the series of pulses is due to the inhibition of the intermediate members of the series by the bright initial reactions which constitute the leading image. "The colorless sensations which arise from excitation of the rods are developed more slowly than those due to excitation of the cones." This supports the view of v. Kries that the two physiological processes are independent.

RAYMOND DODGE.

WESLEYAN UNIVERSITY.

We regret the delay in the appearance of the January REVIEW (Article Section). It was due to the loss of certain proofs, without which the color-plates could not be printed. — EDITORS.

BOOKS RECEIVED FROM DECEMBER 5, 1904,
TO JANUARY 5, 1905.

- Education in Religion and Morals.* G. A. COE. Chicago and New York, Revell, 1904. Pp. 434.
- Multiple Personality.* B. SIDIS and S. P. GOODHART. New York, Appletons, 1905. Pp. xi + 462.
- A Study on Consciousness.* A. BESANT. New York, Lane; London, Theosoph. Publ. Co., 1904. Pp. ix + 443.
- Fetichism in West Africa.* R. H. NASSAU. New York, Scribners, 1904. Pp. xvii + 389. ['Forty years' observations of native customs and superstitions' — subtitle.]
- Untersuchungen zur Gegenstandstheorie und Psychologie.* A. MEINONG (ed.). Leipzig, Barth, 1904. Pp. x + 634. Mk. 18. [Eleven papers by Meinong and his pupils, published 'zum zehnjährigen Bestande des Psychologischen Laboratoriums der Universität Graz' — the first laboratory in Austria, founded in 1894.]
- Psychology. An Introductory Study of the Structure and Function of Human Consciousness.* J. R. ANGELL. New York, Holt, 1904. Pp. vii + 402.
- The Anatomy of the Brain.* J. F. BURKHOLDER. Chicago, G. P. Engelhard & Co., 1904. Pp. 174.
- Annual Report of the Surgeon-General of the Public Health and Marine-Hospital Service of the United States.* Washington Gov. Print. Off., 1904. Pp. 677.
- Studien zur Blindenpsychologie.* THEODOR HELLER. Leipzig, W. ENGELMANN, 1904. Pp. 136.
- Le charbon dans le nord de la Belgique.* LEENER, WODON and MAXWEILER. Brussels, Misch & Thron, 1904. Pp. vii + 217. (Institut Solvay's publications on Sociology.)
- Addresses and Proceedings of the National Educational Association. Forty-third Annual Meeting, St. Louis, Mo., 1904.* Winona (Minn.), Publ. by the Association, 1904. Pp. ix + 1003.
- Yearbook and List of Active Members of the National Educational Association, 1904-5.* Winona (Minn.), Publ. by the Association, 1904. Pp. 258.

- The Aseptic Technic of Abdominal Surgery with the Topographical and Visceral Anatomy of Male and Female Abdomen.* H. O. WALKER. Repr. fr. *The Leucocyte*, Nov., 1904. Pp. 12.
- Plan d'une physiopathologie clinique des centres psychiques.* J. GRASSET. Montpellier, Impr. Delord-Boehm et Martial, 1904. Pp. 183.
- Our Schools, their Administration and Supervision.* WALTER ESTABROOK CHANCELLOR. Boston, D. C. Heath & Co., 1904. Pp. xiii + 434.
- Pædologisch Jaarboek; 5th year, 1904.* M. C. SCHUYTEN (ed.). Antwerp and Ghent, Nederlandsche Boekh.; Paris, Schleicher, 1904. Pp. 263.

NOTES AND NEWS.

THE twenty-ninth of November was the seventieth anniversary of the birthday of Professor Howison, of the University of California. His colleagues in the University joined with other friends in celebrating the occasion, and a number of his former students scattered throughout the country presented him with a *Festschrift* published in his honor.

WE have received the announcement of the Fifth International Congress of Psychology, to be held at Rome, April 26-30, 1905. The officers of organization are: Honorary President, Luciani; President, Sergi; General Secretary, Tamburini; Vice General Secretary, De Sanctis. There are to be four sections: Experimental (G. Fano), Introspective (Ardigò), Pathological (Morselli), and Criminal (Lombroso). The general secretary may be addressed at 92 Via Depretis, Rome. There are to be general sessions also, at which prominent psychologists are to be asked to speak.

WE regret to record the death at Oxford of Thomas Fowler, President of Corpus Christi, author of well-known works on logic and ethics; also of M. Paul Tannery, the French philosopher and historian, who died on November 27, and of Dr. Karl Ueberhorst, professor of philosophy at the University of Innsbrück.

THE annual meetings of the American Psychological Association and American Philosophical Association, held in Philadelphia December 28-30, and of the Southern Society for Philosophy and Psychology, held at Baltimore and Philadelphia, will be reported in the February issue of the BULLETIN.

